

Update of HEC-9, Debris Control Structures

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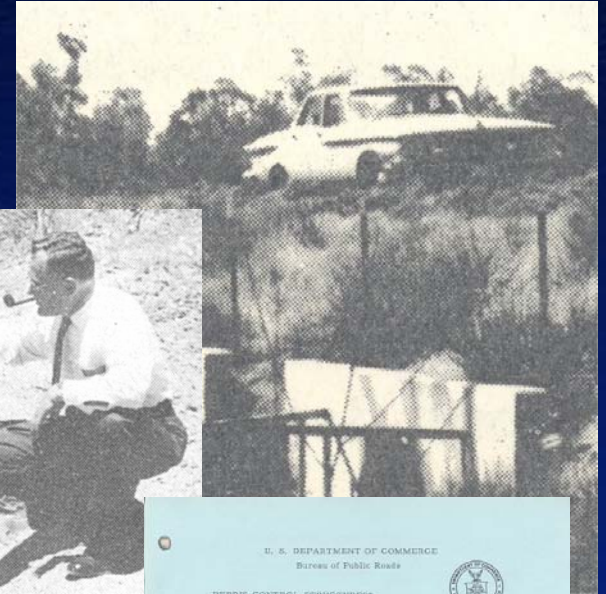
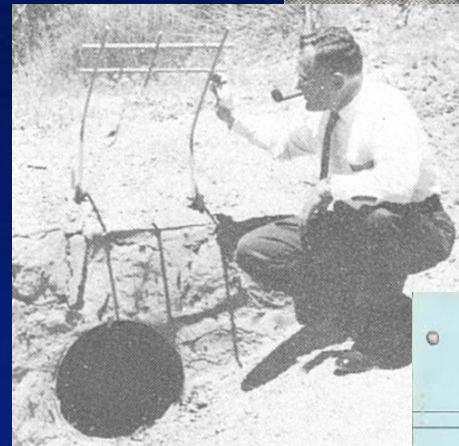


HEC-9, 2nd Edition

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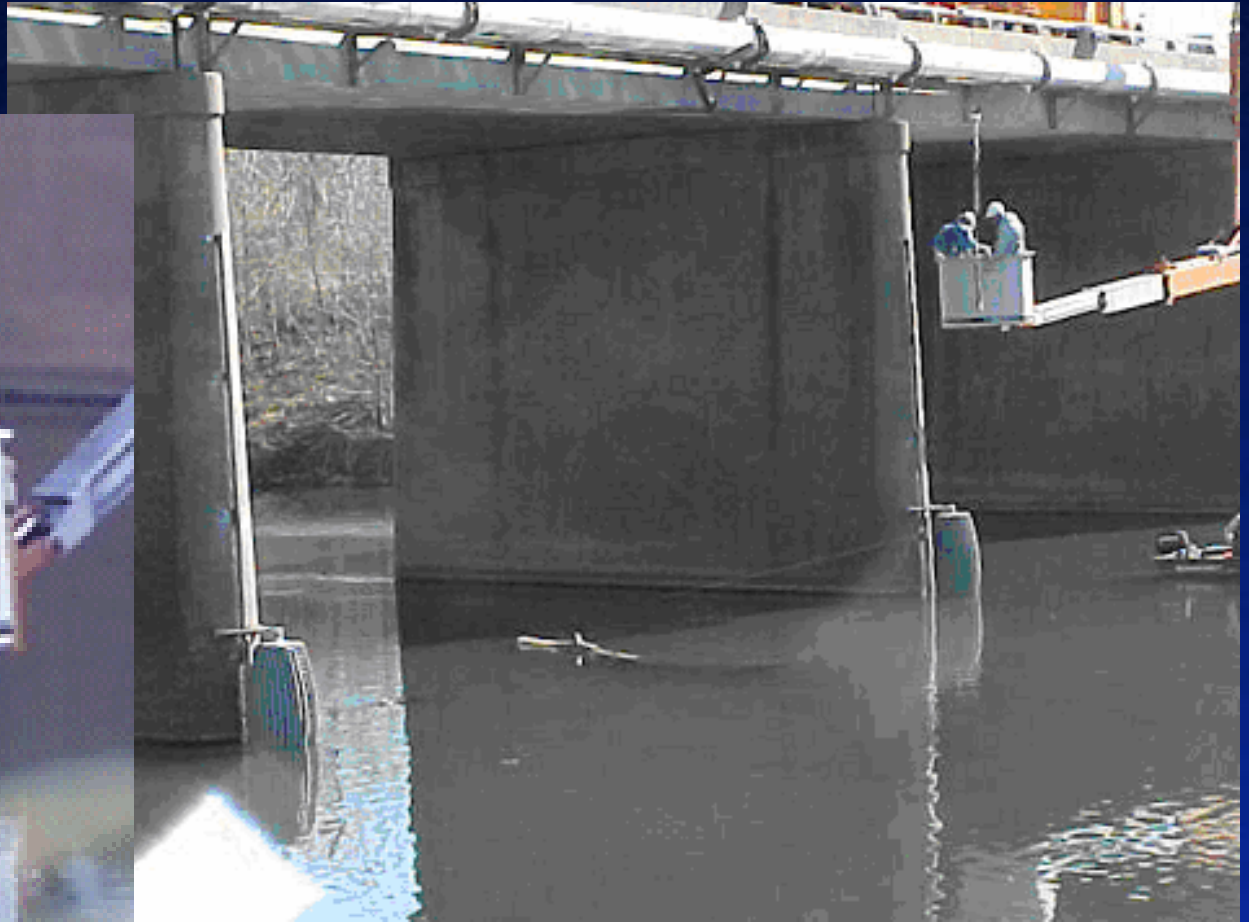
Why Update HEC-9?

- Circa 1971 (1964)
- Include Bridges
- Design Procedures
- Example Problems
- New Devices
- New Research



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| U. S. DEPARTMENT OF COMMERCE Bureau of Public Roads | |
| DEBRIS-CONTROL STRUCTURES* | |
| Hydraulic Engineering Circular No. 9 February 1964 | |
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| *Available on request from Office of Engineering and Operations | |
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| For Official Distribution | |

New Devices



New Research

- Chang & Shen, 1979, “**Debris Problems in the River Environment**”, FHWA-RD-79-62, USDOT, FHWA
- Diehl, 1997, “**Potential Drift Accumulation at Bridges**”, FHWA-RD-97-28, USDOT, FHWA
- Parola, 2000, “**Debris Forces on Highway Bridges**”, NCHRP 445, NCHRP
- Wallerstein, Thorne, & Abt, 1997, “**Debris Control at Hydraulic Structures in Selected Areas of the United States and Europe**”, USACOE, WES

Major HEC-9 Topics

- The “debris problem”
 - Classification of debris
 - Flow behavior of debris
 - Increased scour, hydraulic loading
- Estimating debris quantities
 - Estimate volume/size
 - Potential for delivery/accumulation
 - Factors affecting debris production

Major HEC-9 Topics (cont.)

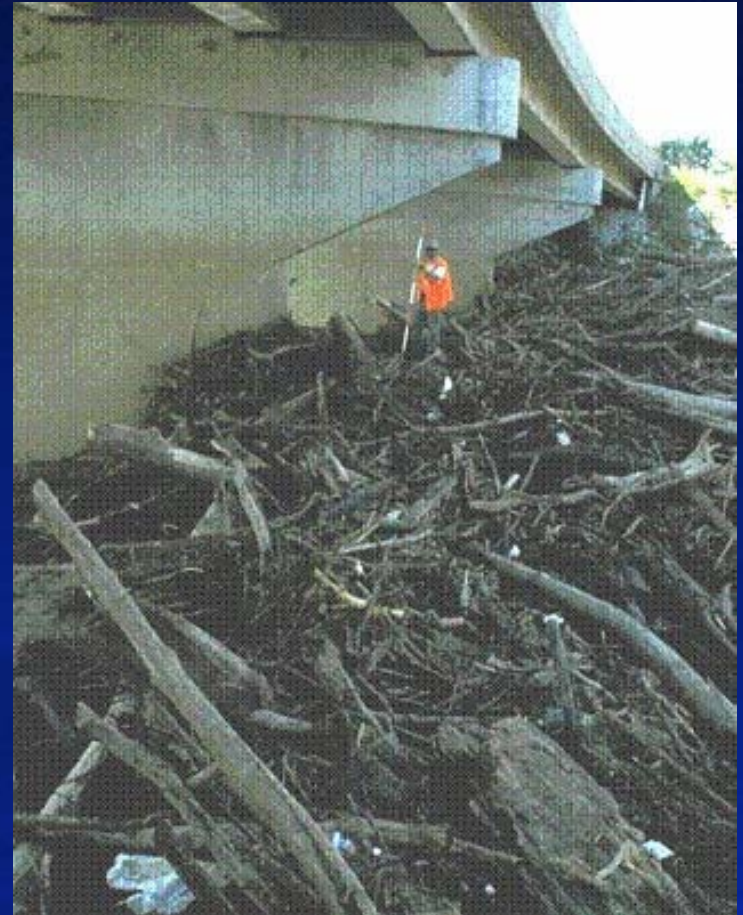
- Analyzing/modeling structural impacts
 - Bridge hydraulics principles
 - Modeling debris in HEC-RAS
 - Computing scour, hydraulic loading
- Countermeasures
 - For culverts: racks, risers, fins, etc.
 - For bridges: deflectors, basins, booms, etc.
 - Structural vs. non-structural

Major HEC-9 Topics (cont.)

- Design procedures
 - Field investigations
 - Countermeasure selection matrix
 - Bridges vs. culverts, proposed vs. existing
 - Guidelines: function, storage area, materials, location, dimensions, details
- Maintenance
 - Inspections, cleaning, debris removal
 - Maintenance plan, design for maintenance

We Need You!

- Pictures (digital/film)
- Design procedures
- Maintenance practices



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Questions?

